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EXAMINER

YAMNITZKY, MARIE ROSE

ART UNIT	PAPER NUMBER
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1774

DATE MAILED: 02/26/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No. 09/632,348		Applicant(s) TANAKA ET AL.	
Examiner Marie R. Yamnitzky		Art Unit 1774	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 09/12/02 & 12/18/02.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1,6,7 and 14-17 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,6,7 and 14-17 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).  
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                             | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____  |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)         | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ | 6) <input type="checkbox"/> Other:  |

Art Unit: 1774

1. This Office action is in response to applicants' amendment filed 09/12/02 (Paper No. 7), which cancels claims 2-5 and 8-13, amends claims 1, 6 and 7, and adds claims 14-17. (New claim 15 is set forth twice in Paper No. 7. The second occurrence of claim 15 has been lined through by the examiner.)

This Office action is also in response to applicants' amendment filed 12/18/02 (Paper No. 10), which amends the specification. (The examiner has made the following two spelling corrections to the replacement paragraph for page 11, lines 15-18 in Paper No. 10:

In the first line, "am" has been changed to --an--. In the last line, "norborane" has been changed to --norbornane--.)

This Office action is also in response to the Rule 132 Declaration of Hiromitsu Tanaka filed 09/12/02 (Paper No. 8).

2. Claims 1, 6, 7 and 14-17 are pending.

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

This Office action raises some new issues not necessitated solely by applicants' amendment. Accordingly, this is not a final action.

3. During the personal interview between applicants' representative and the examiner on July 10, 2002, the examiner indicated that a claim combining the limitations of claim 4 and r4-r17 and r20-r22 of claim 5 would overcome the rejection based on Suzuki. However, upon

Art Unit: 1774

further consideration of the structural similarity between formula r14 and the amino groups utilized by Suzuki, it is the examiner's position that she should not have included r14 in the limitations to be combined.

4. The disclosure is objected to because of the following informalities:

The specification sets forth various examples of "aromatic compounds" that are not aromatic. In particular, see the last two lines on page 8 and lines 14-15 on page 28.

The name set forth in lines 8-9 on page 56 for compound 27 does not correspond to the formula for compound 27 as set forth on page 57.

In addition, the reactants named in lines 2-3 on page 56 do not correspond to the name set forth in lines 8-9 on page 56 for compound 27 and do not correspond to the formula for compound 27 as set forth on page 57.

The name set forth in lines 8-9 does not reflect the presence of the phenyl groups in the diiodophenylnorbornane reactant. The formula set forth on page 57 does not represent a compound made from the diiodophenylnorbornane reactant because the formula only contains one of the two phenyl groups that would be provided by the diiodophenylnorbornane reactant. The formula set forth on page 57 also does not represent a compound made from the 10-(9-benzothiazolylanthryl)borate reactant because the heterocyclic groups shown in the formula are benzoxazolyl groups rather than benzothiazolyl groups. Formula (27) is the same as formula (a12) on page 18 and formula (a12) in present claim 17. Based on the discrepancies on pages

56-57, the examiner wonders if formula (a12) is correct, or if formula (a12) represents a different compound than the compound made as described on page 56.

Appropriate correction is required.

5. Claim 6 is rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Claim 6 depends from cancelled claim 5. For purposes of this rejection, claim 6 is interpreted as if dependent from claim 1.

In Paper No. 7, applicants indicate that the amendment to claim 6 is supported by the original claims. The examiner does not find support for the last two lines of amended claim 6 (i.e. "wherein the aromatic compound is bonded via...") in the original claims or in the application as a whole as originally filed.

6. Claims 1, 6, 7 and 14-17 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1 recites "at least one organic compound layer is a condensed ring compound derivative" and claims 7 and 14 recite "at least one said organic compound layer is an adamantane derivative" (emphasis added). The use of the term "is" in these phrases is

confusing. It is not clear if the term “is” requires that the layer “consist of” the specified derivative, or if it is sufficient for the at least one layer to “comprise” the derivative.

Claim 1 includes the variable “R” in formulae (a) to (l) and in formulae (r17) and (r20)-(r22). Claim 1 first defines “R” as representing a functional unit represented by one of formulae (r4) to (r17) or (r20) to (r22) and later defines “R” as representing saturated hydrocarbon from C1 through C30 or an aromatic compound. The two different definitions of R are confusing.

In claim 1, it is not clear which of the two lines of formula (r8) indicates the bond position of the functional unit to the rest of the compound structure. That is, is the functional unit bonded to the rest of the compound structure via the nitrogen or via the heterocyclic ring?

The limitations of claim 6 as dependent from cancelled claim 5 are not clear. (For purposes of comparing to the prior art, the examiner will interpret claim 6 as if dependent from claim 1.)

Presuming claim 6 further defines claim 1, it is not clear if the “R” which is being further defined is the “R” in formulae (a) to (l) or the “R” in formulae (r17) and (r20) to (r22), or all R’s in claim 1.

Regardless of which R’s are being further defined by claim 6, claim 6 confuses the scope of a condensed ring compound derivative as encompassed by claim 1 because it is not clear what is meant by the phrase “wherein the aromatic compound is bonded via...”. If the requirement that the aromatic compound be “bonded via” means that the aromatic compound selected from the group set forth in lines 3-11 of claim 6 is bonded to the rest of the compound structure via

Art Unit: 1774

one of the possibilities set forth in the last two lines of claim 6, claim 6 encompasses functional units outside the scope of the formulae set forth in claim 1.

If the "bonded via" language of claim 6 means that the aromatic compound is bonded to the rest of the compound structure via one the possibilities set forth in the last two lines of claim 6, the language is also confusing because three of the possibilities set forth in the last two lines are not divalent. It is not clear what would be present to fill the valencies beyond the first two valencies.

It is not clear if claim 6 is defining a required compound or an optional compound. In other words, it is not clear if the condensed ring compound required by claim 6 must contain functional units having a formula set forth in claim 1 that contains R and further wherein R must represent an aromatic compound. For example, would a condensed ring compound wherein each functional unit is represented by formula (r4) be outside the scope of claim 6? Would a condensed ring compound wherein each functional unit is represented by formula (r20) wherein R of formula (r20) represents a methyl group be outside the scope of claim 6?

"R" is not defined for -N(R)-, -(Si(R)<sub>2</sub>)- or -B(R)- as set forth in the last two lines of claim 6. It is not clear if the "R" of these three divalent groups is limited to the Markush group members set forth in lines 3-11 of claim 6.

Claim 6 includes the chemical names "furazalyl" (line 5), "chromelyl" (line 7) and "puritedinyl" (line 10). The examiner has looked to several sources to find the definitions of these three names but has not found definitions. Applicants are respectfully requested to verify that the spelling of these three names is correct and provide definitions for the three.

The use of the term “and” in the definition of Ar1 and Ar2 as set forth in claim 14 is confusing in light of the dependent claims. While claim 14 requires these variables to represent functional units having “hole transporting ability, luminescence, and electron transporting ability” (emphasis added), the dependent claims encompass functional units that do not possess all three of these functions. Clarification of the claim language is required. (For purposes of comparing to the prior art, the examiner will interpret claims 14-16 as if “and” in the penultimate line of claim 14 reads --and/or--.)

In reciting “R1 through R8 represent substituents”, it is not clear if claim 14, with claims 15 and 16 dependent therefrom, are limited to adamantane derivatives of the formula in which each of R1 through R8 represents something other than hydrogen. In other words, does the term “substituents” exclude hydrogen? (The examiner notes that if the term “substituents” excludes hydrogen, then none of the specific compounds disclosed in the specification are within the scope of claims 14-16.)

Claim 14, with claims 15 and 16 dependent therefrom, requires Ar1 and Ar2 to represent functional units having an aryl skeleton as a “basic skeleton”. The limitations imposed by this requirement are not clear. In particular, it is not clear if this language requires a carbon of an aryl group to be directly attached to the benzene ring where Ar1 and Ar2 are shown in the formula. For example, are compounds of formulae (8)-(10) as shown on pages 32-33 of the specification outside the scope of claims 14-16?

Claim 16 does not utilize proper Markush language in reciting “selected from a group of” (lines 2-3).



The norbornane derivative represented by formula (a12) as set forth in claim 17 is the same as the norbornane derivative represented by formula (27) as shown on page 57, but the description of the synthesis of the norbornane derivative as set forth on page 56 does not provide a compound of formula (27) for the reasons noted in the objection to the disclosure. Based on the discrepancies on pages 56-57, the examiner wonders if formula (a12) is correct, or if formula (a12) represents a different compound than the compound made as described on page 56.

7. Claims 14-16 are rejected under 35 U.S.C. 102(b) as being anticipated by Suzuki et al. (US 5,420,351).

This rejection is made subject to clarification of the limitations of the claims as questioned in the rejection under 35 U.S.C. 112, second paragraph. If the term "substituents" excludes hydrogen such that each of R1 through R8 must represent something other than hydrogen and/or if the requirement that Ar1 and Ar2 represent functional units having an aryl skeleton as a basic skeleton means that a carbon of an aryl group must be directly attached to the benzene ring where Ar1 and Ar2 are shown in the formula, then Suzuki et al. do not anticipate claims 14-16.

See the whole patent. In particular, see column 2, line 65-c. 3, l. 24, c. 5, l. 14-35, c. 5, l. 60-c.6, l. 10 and c. 6, l. 48-c.7, l. 32.

The EL device described in the prior art Reference Example (c. 6-7) meets the limitations of the electroluminescent element of claims 14-16 wherein, in the adamantane derivative of the formula set forth in claim 7, each of R1 through R8 represents hydrogen, and each of Ar1 and

Art Unit: 1774

Ar2 represents a diphenylamino group in which each phenyl of the diphenylamino groups may be further substituted. The presence of the phenyl groups in the diphenylamino groups is considered to meet the present claim requirement for an aryl skeleton as a basic skeleton absent clarification of the claim language to the contrary.

8. Claims 1, 7 and 14-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Suzuki et al. (5,420,351) as applied to claims 14-16 above, and for the further reasons set forth below.

An adamantane compound of formula (d) as set forth in claim 1 wherein each R represents a functional unit of formula (r14) as set forth in claim 1 is similar to the adamantane compounds disclosed by Suzuki et al. except that the diarylamino group provided by formula (r14) has a naphthyl group in place of one of the phenyl groups of Suzuki's diarylamino groups.

The compounds of formula (a1)-(a6) in present claim 7 are compounds similar to the adamantane compounds disclosed by Suzuki et al. in which at least one phenylene group attaching a diarylamino group to the adamantane group contains at least one alkyl substituent ((a1), (a2), (a3), (a5) and (a6)) or in which a naphthylene group is provided in place of the phenylene group attaching each diarylamino group to the adamantane group (a4), and/or in which the aryl groups of the diarylamino group are naphthyl or anthryl groups instead of phenyl groups ((a5) and (a6)).

In the event that claims 14-16 require each of R1 through R8 to be something other than hydrogen and/or require the aryl skeleton as a basic skeleton to have a carbon of an aryl group

attached directly to the benzene ring where Ar1 and Ar2 are shown in the formula in claim 14, the compound required by claim 14 is different than, but similar to, the adamantane compounds disclosed by Suzuki et al.

It would have been *prima facie* obvious to one of ordinary skill in the art at the time of the invention to make adamantane compounds similar in structure to the adamantane compounds of Suzuki et al. with the expectation that compounds similar in structure to Suzuki's compounds would have similar properties and could be used for the same purpose as Suzuki's compounds. One of ordinary skill in the art would have been motivated to make adamantane compounds similar in structure to Suzuki's compounds in order to provide other adamantane compounds having hole transporting properties that would be useful in an organic electroluminescent device as taught by Suzuki et al.

9. Applicants' arguments filed 09/12/02 have been fully considered in conjunction with the Rule 132 Declaration filed 09/12/02 but they are not persuasive.

The relevance of the estimated rotation energy barrier and thermotolerance of the compounds as set forth in the Rule 132 Declaration to the claimed subject matter is unclear. The data presented in the declaration does not clearly demonstrate that the adamantane compounds according to the present claims that are similar to Suzuki's compounds would necessarily provide an EL device having superior/unexpected properties compared to EL devices made with Suzuki's compounds. Further, although Fig. 1 as shown in the declaration is said to represent a compound of the present invention, the formula shown in Fig. 1 only has one tertiary amine

substituent on the adamantyl radical whereas the adamantane compounds encompassed by the present claims and disclosed by Suzuki et al. have two tertiary amine substituents on the adamantyl radical.

10. Miscellaneous:

In the line before formula (r4) in claim 1, "r(22)" should read --(r22)--.

In line 8 of claim 6, "dibenzofuril" should apparently read --dibenzofuryl--.

Claims 7 and 17 are each lacking a period at the end of the claim.

In line 2 of claim 15, "group of consisting of" should read --group consisting of--.

The fourth line of claim 16 recites "hydroxyl group, "hydroxylate group". The examiner suggests that the term --hydroxy-- be used instead of "hydroxyl" since "hydroxyl" refers to the -OH group in inorganic compounds whereas "hydroxy" refers to the -OH group in organic compounds. The phrase "hydroxylate group" also appears to encompass the same thing as "hydroxy group" and should be deleted since "hydroxylation" refers to a process in which an -OH group is formed in an organic compound. In the alternative, if applicants are using the term "hydroxylate group" to mean something other than an -OH group, applicants are respectfully requested to clarify the record.

In line 5 of claim 16, the comma after "haloformyl" should be deleted.

The phrase "alkoxy group" is recited twice in claim 16 (line 3 and the last line). One occurrence of "alkoxy group" should be deleted.

In line 3 of claim 17, "norborane" should read --norbornane--.

Art Unit: 1774

11. Patentable subject matter:

The prior art does not disclose or suggest an organic electroluminescent device comprising a pair of electrodes and, between the pair of electrodes, at least one organic compound layer comprising an adamantane derivative represented by one of formulae (a7)-(a11) and (a13) as shown in present claim 7.

The prior art does not disclose or suggest an organic electroluminescent device comprising a pair of electrodes and, between the pair of electrodes, at least one organic compound layer comprising a condensed ring compound derivative represented by one of chemical formulae (a) to (l) as shown in present claim 1 wherein each R in chemical formulae (a) to (l) represents a functional unit represented by one of chemical formulae (r4)-(r13), (r15) or (r16) as shown in present claim 1. However, note that formula (r8) requires clarification regarding which of the two lines of formula (r8) indicates the bond position of the functional unit to the rest of the compound structure.

12. Any inquiry concerning this communication should be directed to Marie R. Yamnitzky at telephone number (703) 308-4413. The examiner works a flexible schedule but can generally be reached at this number from 6:30 a.m. to 4:00 p.m. Monday, Tuesday, Thursday and Friday, and every other Wednesday from 6:30 a.m. to 3:00 p.m.

The current fax numbers for Art Unit 1774 are (703) 872-9311 for official after final faxes and (703) 872-9310 or (703) 305-5408 for all other official faxes. (Unofficial faxes to be sent directly to examiner Yamnitzky can be sent to (703) 872-9041.)

MRY  
02/23/03



MARIE YAMNITZKY  
PRIMARY EXAMINER

1774